

# SIEMENS

# SONOCUR

**SP**

## Installation and Setting Instructions

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## Safety information

### General safety information

When it is necessary to perform service work while high voltage is present at the component, adhere to the general safety regulations.

For all other service work, disconnect the line voltage plug of the SONOCUR.

When replacing boards or assemblies, switch off the SONOCUR, and observe ESD regulations.

After all work is completed and all covers have been reattached, perform the protective conductor test according to ARTD-002.731.17.

The protective conductor resistance may not exceed 0.2 ohm.

When servicing the power-on assembly (replacing the power-on assembly or the power cord) the equivalent leakage current must be measured and documented.

### Adaptation of the mains plug to local conditions

The customer can have the mains plug fitted on the power cable on delivery replaced by a mains plug of other (national) design by an electrotechnical specialist, if:

- the mains plug used can conduct the power required for the operation of the system (see current and voltage values, stated on the line voltage plate or in the operating instructions)  
and
- the required line internal resistance is reached (see planning guide of the system)  
and
- the selectivity of the protection is assured corresponding to the relevant national standards.

In addition the customer must ensure that a connection to unsuitable power supplies is prevented (e.g. by labeling or design measures).

Perform and document protective conductor measurements as concluding measure.

### Note on the mains connection

The condition on delivery of the system with regard to the mains connection values can be seen on the line voltage plate or it is stated in the operating instructions.

Perform any required adaptations to the local conditions in accordance with the service instructions / the wiring diagram of the system.

Observe the notes on the device leakage current measurement.

**Notes on the protective conductor test**

Observe the statements in the safety engineering rules for installation and maintenance (ARTD-002.731.17...).

The protective conductor resistance of 0.2 ohms must not be exceeded.

**First measured value**

In systems that are delivered completely tested from the factory, the protective conductor test was already performed and the measured values recorded in the test report of the system.

The measurements were performed with the measuring method and measuring equipment recorded in the test report of the system.

The test report is an integral part of the documentation supplied with the system.

If no covers were opened and no additional components (e.g. options) were installed or modified during the installation of the system, then the values recorded in the test report with statement of the measuring point (e.g. basic unit cover) can be transferred as first measured value to the protective conductor resistance report.

If the power plug was changed, covers were removed or additional components installed or modified during the installation of the system, then the values stated in the test report are invalid.

The values must be identified as invalid. To do this cross out the values, enter the note "Value invalid" and confirm with name, date and signature.

The protective conductor test must be performed anew after completion of all work.

In systems without recorded measured values for the protective conductor test in the test report of the system, perform the protective conductor test after completion of all work.

**Measurement**

Perform the measurement according to DIN VDE 0751, Part 1 (see ARTD Part 2). In this case measure the protective conductor resistance to all conductive touchable parts of the system in the normal operating condition of the system.

It must be ensured that control cables or data cables between the components of the system do not simulate a protective conductor connection.

During the measurement move the power cable and additional connection cables with integrated protective conductors (e.g. cables between the basic unit and monitor trolley) section by section to detect wire breaks.

The protective conductor resistance must not exceed 0.2 ohms.

Record the values as first measured values in the protective conductor report stating the measuring points.

In addition document the measuring method and the measuring instrument used (designation and serial number).

Separate the page with the report from these instructions and file it in the system folder or logbook, "Reports" register.

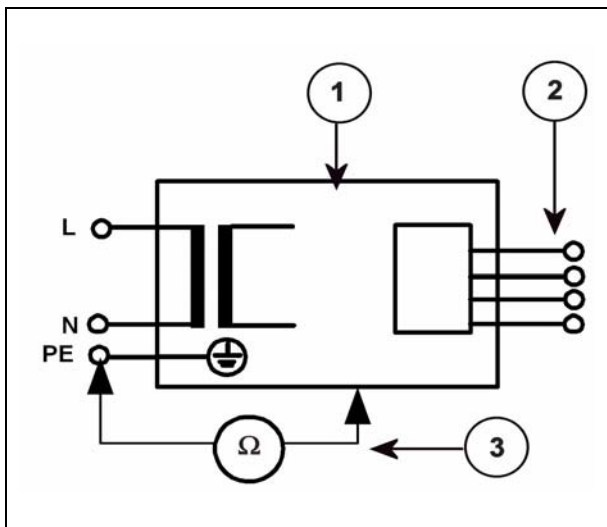


Fig. 1 Measuring circuit for measuring the protective conductor resistance in systems that are separated from the mains, according to DIN VDE 0751-1:2001-10, Fig. C2.

1 = System

2 = Application part Type B

3 = Measuring set-up (integrated in the measuring instrument)

### Repeat measurement

In maintenance or repairs perform the protective conductor resistance measurement anew.

Document and assess the values determined in the repeat measurement.

Perform the measurement according to DIN VDE 0751, Part 1 (see ARTD Part 2). In this case measure the protective conductor resistance to all conductive touchable parts of the system in the normal operating condition of the system.

It must be ensured that control cables or data cables between the components of the system do not simulate a protective conductor connection.

During the measurement move the power cable and additional connection cables with integrated protective conductors (e.g. cables between the basic unit and monitor trolley) section by section to detect wire breaks.

The protective conductor resistance must not exceed 0.2 ohms.

Record and assess the values determined in the repeat measurement in the protective conductor report stating the measuring points.

In addition document the measuring method and the measuring instrument used (designation and serial number).

**NOTE**

**For the assessment compare the first measured value and the values documented during previous maintenance or safety checks with the measured values.**

**An abrupt rise of the measured values, even if the limit of 0.2 ohms is not exceeded, indicates defects in the protective conductor connections (protective conductor or contacting).**

**Applicability and regulations for subsidiaries****Notes on the device leakage current measurement**

Observe the statements in the safety engineering rules for installation and maintenance (ARTD-002.731.17...).

**⚠ WARNING**

**Electrical voltage!**

**Non-compliance can lead to severe injuries up to death.**

**The equivalent device leakage current measurements may be performed in systems of protective class I only after the protective conductor test has been passed.**

**First measured value**

In systems that are delivered completely tested from the factory, the device leakage current measurement was performed in the factory and the measured value recorded in the test report of the system.

The measurement was performed with the line voltage, line frequency, the recorded measuring method and the recorded measuring equipment recorded in the test report of the system.

The test report is an integral part of the documentation delivered with the system.

In the case of agreement of the line voltage and of the line frequency, transfer the value recorded in the test report as first measurement into the device leakage current report.

If the local line voltage or line frequency deviates from the condition on delivery of the system, or if no measurement was performed and recorded in the factory, perform the device leakage current measurement.

If the local line voltage or line frequency deviates from the condition on delivery of the system, then the values stated in the test report are invalid.

Mark the values as invalid. Document the reason for the new determination of the first measured value and confirm with date, name and signature.

Adjust the system to the local line voltage / line frequency before the measurement.

In systems without recorded measurements for the device leakage current measurement in the test report of the system, perform the device leakage current test after completion of all work.



### Measurement

Perform the measurement according to DIN VDE 0751, Part 1 (see ARTD-002.731.17...) and record the determined value as first measured value.

Preference should be given to measuring the device leakage current according to the differential current method (measuring set-up according to Fig. 2), since no danger for the person performing the measurement and other persons arises.

However, observe the minimum resolution of the leakage current measuring instrument and additional manufacturer's data which restrict the use of the measuring instrument.

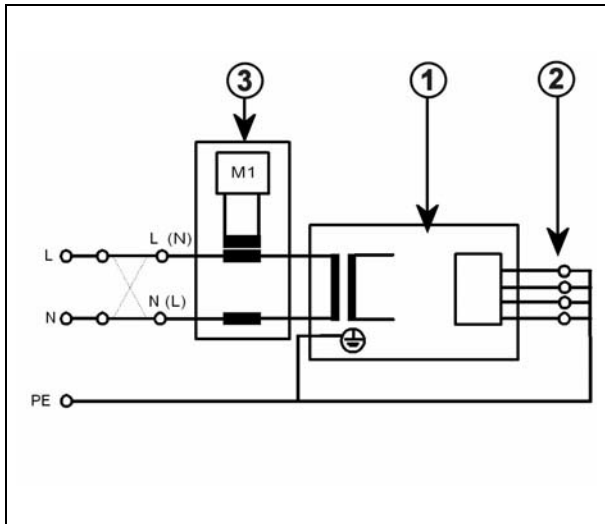


Fig. 2 Measuring circuit for measuring the device leakage current according to the differential current method according to DIN VDE 0751-1:2001-10, Fig. C6 for protective class I.

1 = System

2 = Application part Type B

3 = Measuring set-up (integrated in the measuring instrument)

If the direct measurement of the device leakage current is used (measuring set-up according to Fig. 3), the system must be set up isolated during the measurement and must not be touched during the measurement.

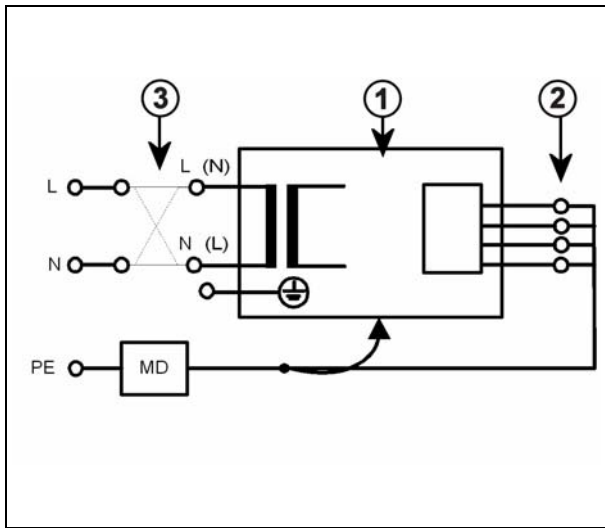


Fig. 3 Measuring circuit for the direct measurement of the device leakage current according to DIN VDE 0751-1:2001-10, Fig. C5 for protective class I.  
 1 = System  
 2 = Application part Type B  
 3 = Measuring set-up (integrated in the measuring instrument)

**⚠ WARNING**

**Electrical voltage!**

**Non-compliance can lead to severe injuries up to death.**

**In the direct measurement of the device leakage current (measuring set-up according to Fig. 3), no housing parts of the system may be touched during the measurement.**

**Third persons must be prevented access to the system.**

The system must be switched on during the measurement. Measuring instruments with automated measuring sequence must therefore be set to manual measurement.

Enter the highest value as first measured value in the device leakage current report.

This value must not exceed the permissible leakage current values according to DIN VDE 0751-1:2001-10, Table F.1, line "device leakage current general", of 0.5 mA.

Measure and record the current line voltage. If the measured line voltage deviates from the nominal voltage, correct the measured value to the value corresponding to a measurement at the nominal value of the line voltage. Document this in addition.

Document the measuring method (differential measurement or direct measurement) and the measuring instrument used (designation and serial number).

Separate the report page from these instructions and file it in the system folder or logbook with the existing reports.

### Repeat measurements

Perform the equivalent device leakage current measurement anew in the case of maintenance or repairs in the primary circuit of the power supply unit (e.g. repairs on the power up circuit or replacement of the mains filter).

The same measuring conditions as in the first measurement apply.

Document and assess the highest value determined in the repeat measurement in the existing device leakage current report.

This value must not exceed the permissible leakage current values according to DIN VDE 0751-1:2001-10, Table F.1, line "device leakage current general", of 0.5 mA.

Measure and record the current line voltage. If the measured line voltage deviates from the nominal voltage, correct the measured value to the value corresponding to a measurement at the nominal value of the line voltage. Document this in addition.

Document the measuring method (differential measurement or direct measurement) and the measuring instrument used (designation and serial number).

#### NOTE

**For the assessment compare the first measured value and the values documented during previous maintenance or safety checks with the measured values.**

**An abrupt rise of the measured values, even if the limit of 0.5 mA is not exceeded, indicates defects in the primary circuit of the mains power supply (insulation damage, moisture damage, defective interference suppression element, etc.).**

### Notes on the patient leakage current measurement

*(Remark: In systems of protective class I with application part Type B measure the patient leakage current on each application part.)*

Observe the statements in the safety engineering rules for installation and maintenance (ARTD-002.731.17...).

#### WARNING

**Electrical voltage!**

**Non-compliance can lead to severe injuries up to death.**

**The patient leakage current measurement may be performed in systems of protective class I only after the protective conductor test has been passed.**

### First measured value

Perform the patient leakage current measurement for every application part.

Adjust / program the system to the local line voltage / line frequency before the measurement.

### Measurement

Perform the measurement according to DIN VDE 0751, Part 1 (see ARTD-002.731.17...) and record the determined values as first measured values.

Cover the front part of the coupling bellows completely with aluminum foil.

During the measurement keep the aluminum foil in good contact with the application part to be measured (coupling bellows) by applying pressure. For this purpose the shock wave head can be moved into the working position, for example, and the coupling bellows coupled against a hard object (wooden board or book).

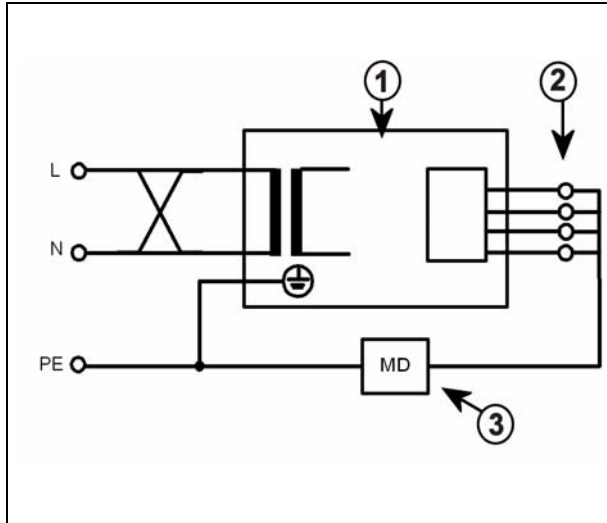


Fig. 4 Measuring circuit for measuring the patient leakage current according to DIN VDE 0751-1:2001-10, Fig. C10 for protective class I.  
 1 = System  
 2 = Application part Type B  
 3 = Measuring set-up (integrated in the measuring instrument)

Enter the determined values as first measured value in the device leakage current report stating the application parts / measuring points.

The values must not exceed for every application part the permissible leakage current values according to DIN VDE 0751-1:2001-10, Table F.1, line "Patient leakage current", of 0.01 mA for direct current or 0.1 mA for alternating current.

Document the measuring method and the measuring instrument used (designation and serial number).

Separate the report page from these instructions and file it in the system folder or logbook with the existing reports.

### Repeat measurement

In the case of maintenance or in repairs to the system which can influence the patient leakage current (for example repairs to the protective conductor connections, replacement of parts in the primary circuit of the power supply unit, replacement of application parts, technical modifications to the application parts) measure and document anew the patient leakage current for each application part.

The same measuring conditions as in the first measurement apply.

Document and assess the values determined in the repeat measurement in the existing patient leakage current report stating the application parts / measuring points.

The values must not exceed the permissible leakage current values according to DIN VDE 0751-1:2001-10, Table F.1, line "Patient leakage current", of 0.01 mA for direct current or 0.1 mA for alternating current.

Document the measuring method and the measuring instrument used (designation and serial number).

<b>NOTE</b>
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**For the assessment compare the first measured value and the values documented during previous maintenance or safety checks with the measured values.**

**An abrupt rise of the measured values, even if the limit of 0.01 mA for direct current or 0.1 mA for alternating current is not exceeded, indicates defects in the system (damage to protective conductor connections, insulation damage, moisture damage, etc.).**

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## Required tools and auxiliary devices


### Tools

- Service equipment
- Safety tester Item No. 51 38 727
- DVM Fluke 187 Item No. 99 94 831

### Auxiliary devices

- 4l distilled water

## Start-up information

- Enter the measurement results for measurements marked "  " in the test protocols indicated.

## Line voltage and line frequency

### Checking the on-site line voltage



- Check the on-site line voltage and line frequency using test protocol 1 (system manual/ Register 4).

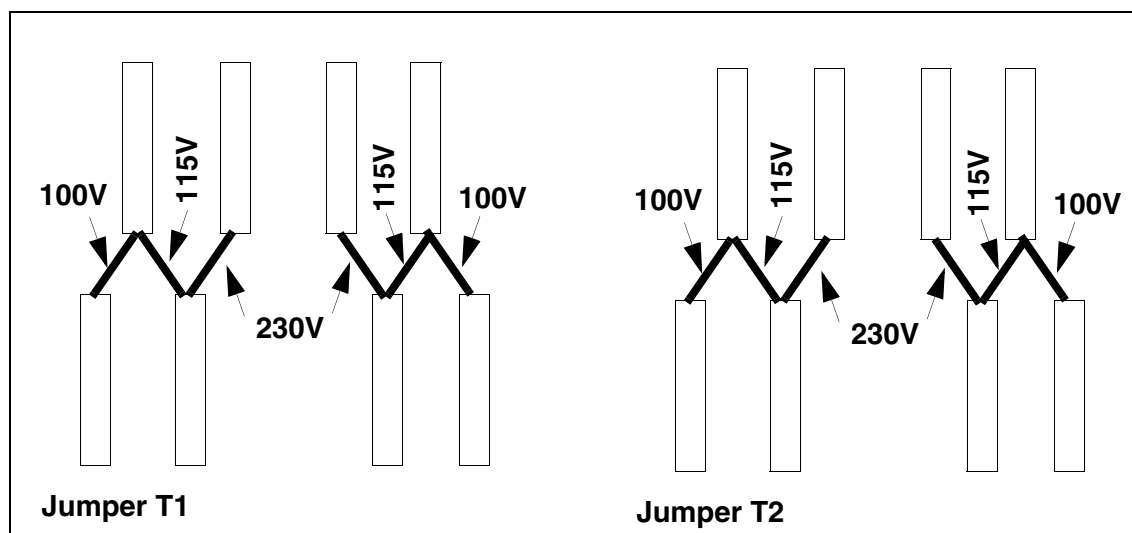
#### NOTICE

The line voltage connection for the SONOCUR at the time of delivery is indicated on the line voltage label. The equivalent leakage current must be measured and entered again only when there are local differences in line voltage or line frequency.

If you have to adapt the line voltage, adhere to the requirements concerning the equivalent leakage current measurement.

### Adapting the line voltage for the SONOCUR (if applicable)

- If the line voltage needs to be adapted, set the jumpers on board D1 as shown below:



### Adapting the line voltage for the SONOLINE (if applicable)

#### NOTE

The line voltage set depends only on the SONOLINE system version being used.

- Connect the SONOLINE as follows:
  - 230V      X2.9 (neutral line)    X2.7 L (Phase L1)
  - 115V      X2.9 (neutral line)    X2.8 L (Phase L1)



Fig. 1

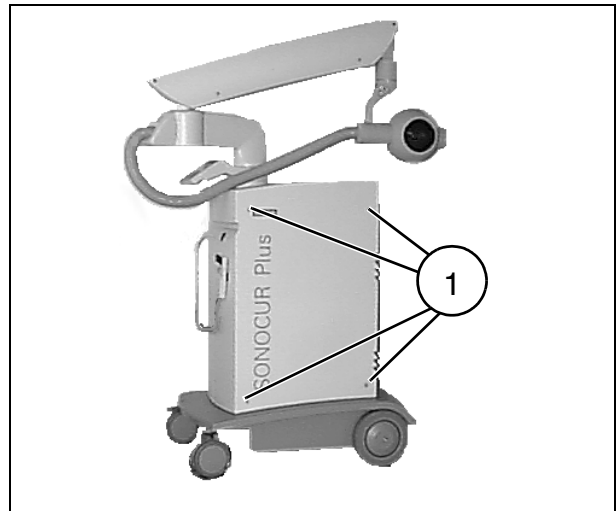


Fig. 2

### Removing the system covers

- Remove the 4 Allen screws (1/Fig. 2) on each side and remove the covers.

### Checking the temperature indicators

- Check both temperature indicators (Fig. 6).
- If the temperature is below  $-4^{\circ}\text{C}$ , a short red bar will be visible in the center white strip of the  $-4^{\circ}\text{C}$  indicator (1/Fig. 6). If the temperature exceeds  $+49^{\circ}\text{C}$ , the large center of the round indicator, which is approx. 3 mm in diameter (2/Fig. 6), will have turned nearly black.
- If the  $-4^{\circ}$  indicator has responded, check the cap of the ultrasound probe in the shock-wave head for leakage and deformation. To do this, remove the cover of the shock wave head and take out the probe (refer to Service Instructions SPT3-130.061.01.xx).
- If the probe is leaky or deformed, it needs to be replaced.
- In addition, after filling the cooling and coupling circuit, check the hydraulics area of the cooling unit for leakage.
- If the  $+49^{\circ}\text{C}$  indicator has responded, perform the same above-described procedure with the ultrasound probe and the hydraulics area.

### Installing the coupling pump

- The coupling pump is located under the water storage tank in front of the power board.
- Fit the hose pump head onto the drive shaft (1/Fig. 4/5).
- Press the black lock (2/Fig. 4/5) upwards or downwards.
- Attach the bracket (4/Fig. 4/5).
- Make the hose connections (see Fig. 4/5).





Fig. 3

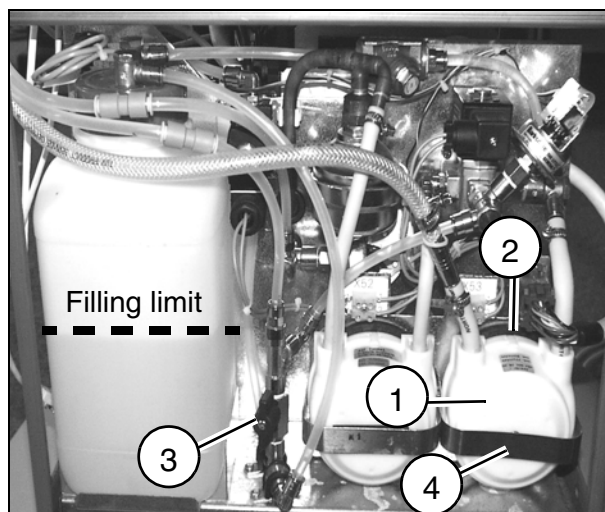


Fig. 4

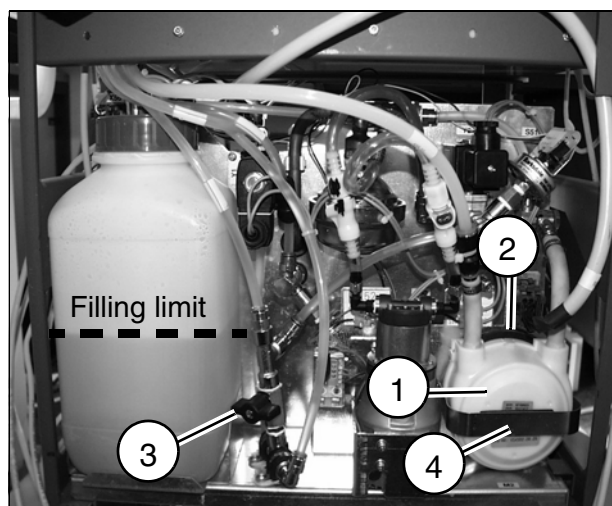


Fig. 5

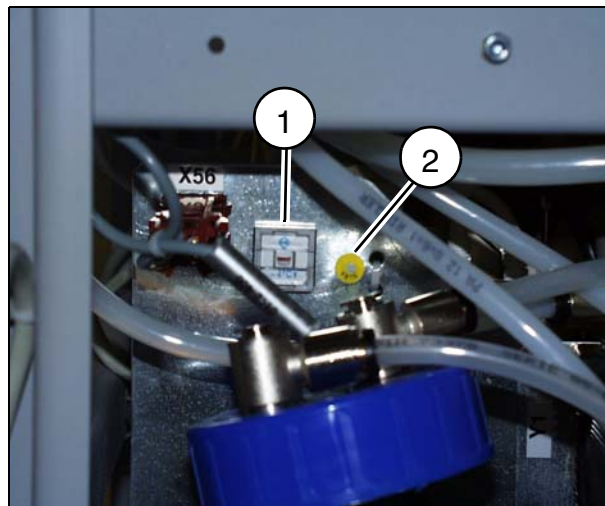


Fig. 6


## Filling the cooling circuit

- Fill the water storage tank halfway with water.
- Switch the system on.
- Move the sound wave head into the filling position for the cooling circuit (Fig. 1).
- Open the pressure relief valve (cap) in the cooling device and back it off by two full turns (2/ Fig. 3).
- Open the 2/3-way valve Y8 (3/ Fig. 4/ 5) i.e., adjust the Y8 lever from horizontal = locked to vertical = open.
- Set the service switch on M13/D3/S2 to position 2 (Service on).

- Press the "Menu" key in the "MAIN MENU" on the control panel (the next menu "STANDARD" is displayed).
- Press the "Next" key in the "STANDARD" menu once (the next menu "EXTRAS" is displayed).
- Press the "Next" key in the "EXTRAS" menu once (the next menu "SERVICEINFO" is displayed).
- Press the "Next" key (the next menu "TOOLS" is displayed).
- Switch "Refill cooling unit" to "ON".

**NOTE**

**You can now control the cooling pump M1 by pressing the  /  keys on the operating panel.**

- Press the  key on the control panel until the water running from the return hose into the water storage tank is free of air bubbles.

**NOTE**

**As long as the  key is held down, hose pump M1 will run and the cooling circuit will fill.**

- Close the 2/3-way valve Y8 (3/Fig. 4/ 5).
- Set the service switch on M13/D3/S2 to position 1 (Service off).
- Switch the system off.

## Filling the coupling circuit

- Fill the water storage tank halfway with water.
- Switch the system on.
- Move the sound wave head into the filling position for the coupling circuit. (This position is marked on the support arm with two arrows).
- Press the "Menu" key in "MAIN MENU" on the control panel (next menu "STANDARD" is displayed).
- Press the "Next" key in the "STANDARD" menu once (next menu "EXTRAS" is displayed).
- Select the water circulation cycle and start.

**NOTE**

**While the water is circulating, move the sound wave head and the corrugated tubing until there are no more air bubbles in the coupling bellow. The water circulation cycle will end automatically.**

- If air bubbles can still be seen in the coupling bellow, restart the water circulation cycle.
- Move the system just into the minimal coupling position.

**NOTE**

**In the minimal coupling range, the bellow will be close to the lens.**

- Switch the system off.
- Fill the water storage tank halfway with water (Fig. 4/ 5).

## Setting the system clock (if applicable)

- Switch the system on.
- Set the service switch on M13/D3/S2 to position 2 (Service on).
- Press the "Menu" key in the "MAIN MENU" on the control panel (the next menu "STANDARD" is displayed).
- Press the "Next" key in the "STANDARD" menu once (the next menu "EXTRAS" is displayed).
- Press the "Next" key in the "EXTRAS" menu once (the next menu "SERVICEINFO" is displayed).
- Press the "Next" key (the next menu "TOOLS" is displayed).
- Select the menu item "SET CLOCK".
- Set the current date and time with the keys.
- Exit the "TOOLS" menu with "set".
- Set the service switch on M13/D3/S2 to position 1 (service off).

## Setting the user language (if applicable)

- Set the service switch on M13/D3/S2 to position 2 (Service on).
- Press the "Menu" key in the "MAIN MENU" on the control panel (the next menu "STANDARD" is displayed).
- Press the "Next" key in the "STANDARD" menu once (the next menu "EXTRAS" is displayed).
- Press the "Next" key in the "EXTRAS" menu once (the next menu "SERVICEINFO" is displayed).
- Press the "Next" key (the next menu "TOOLS" is displayed).
- Select the menu item "Toggle Language".
- Use the "Select" key to select the desired language.
- Exit the "Tools" menu with "NEXT".
- Set the service switch on M13/D3/S2 to position 1 (service off).

## Function test

(Procedure according to Operating Instructions SPT3-130.620.01)

- Support arm movements.
- Brakes.
- Sound wave focus. If outside the specified tolerance, readjust according to the service instructions SPT3-130.061.01... .
- Maneuverability.

## Testing the sound wave release

### SONOCUR Basic / SONOCUR Plus

<b>NOTICE</b>
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**Do not remove or replace the SONOCARD Gold chip card installed in the card reader.  
This will invalidate the card.**

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- Test the sound wave release at low and high energy levels.

### SONOCUR Plus C

- Insert the supplied SONOCARD 1500 chip card supplied into the chip card reader.
- Test sound wave release at low and high energy levels.
- Remove the SONOCARD 1500 chip card and file in system manual, Register 6.
- If present, insert the SONOCARD 60000 chip card in the chip card reader.

## Final steps

Perform a final visual inspection.



- Measure the protective conductor resistance according to ARTD - 002.731.17.
- Turn over the customer documents.



- The manufacturer of this product requires information and the legislator demands proofs that a product delivered free of defects from the factory continues to possess the required and certified quality properties on installation and start-up.

It is therefore absolutely necessary that the installation report with the installation and start-up data is sent without delay after completion of the work to the address stated on the installation report.

You will find the report in the system folder.

## Protective conductor resistance report

System: \_\_\_\_\_

Material number: \_\_\_\_\_

Serial number: \_\_\_\_\_

Cust-spec. ident number \_\_\_\_\_

	Protective conductor resistance					
	First measured value	Repeat measurements measured value				
Measuring point 1: _____						
Measuring point 2: _____						
Measuring point 3 _____						
Measuring point 4 _____						
Measuring point 5 _____						
Measuring point 6 _____						
Measuring point 7 _____						
Measuring point 8 _____						
(*1) Measuring circuit:						
Measuring instrument type:						
Measuring instrument Ser No.:						
Measuring instrument calibrated to:						
Assessment:	n.a.					
Date:						
Name:						
Signature						

Tab. 1

(\*1) Measuring circuit: See Fig. 1, next page

### Measuring circuit

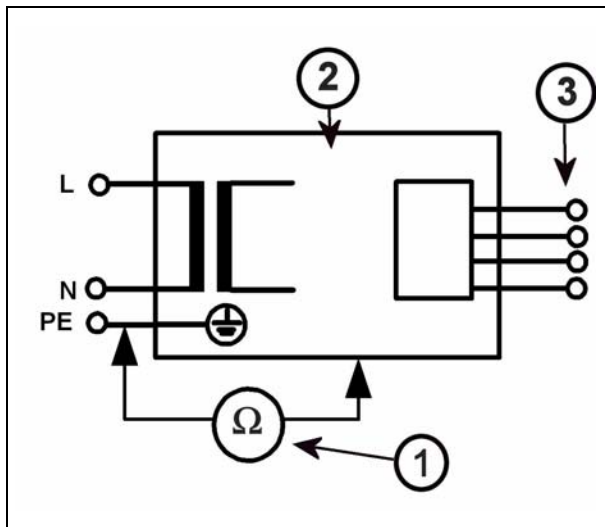


Fig. 1 Measuring circuit for measuring the protective conductor resistance in systems separated from the power supply, according to DIN VDE 0751-1:2001-10, Fig. C2.

1 = Measuring set-up (measuring instrument)

2 = System

3 = Application part (if present)

### Comments:

Date	Comment	Name	Signature

Tab. 2

## Device leakage current report

System: \_\_\_\_\_  
 Material number: \_\_\_\_\_  
 Serial number: \_\_\_\_\_  
 Cust.-spec. ident number \_\_\_\_\_

Device leakage current						
	First measured value	Repeat measurements measured value				
Device leakage current (highest measured value) [mA]						
Line voltage during the measurement [V~]						
Device leakage current, corrected value [mA]						
(*1) Measuring circuit:						
Measuring instrument type:						
Measuring instrument Ser No.:						
Measuring instrument calibrated up to:						
Assessment:						
Date:						
Name:						
Signature:						

Tab. 3

(\*1) Measuring circuit: See Fig. 2 to Fig. 5, next page

## Measuring circuit

### Direct measurement

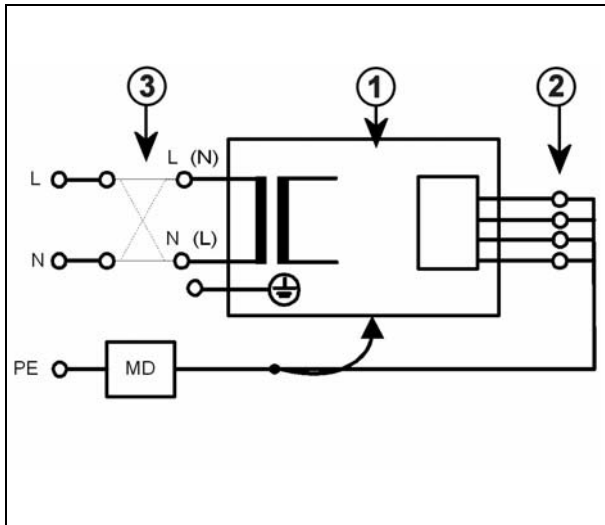


Fig. 2 Measuring circuit for direct measurement of the device leakage current according to DIN VDE 0751-1:2001-10, Fig. C5 for protective class I.

- 1 = System
- 2 = Application part (if present)
- 3 = Measuring set-up (integrated in the measuring instrument)

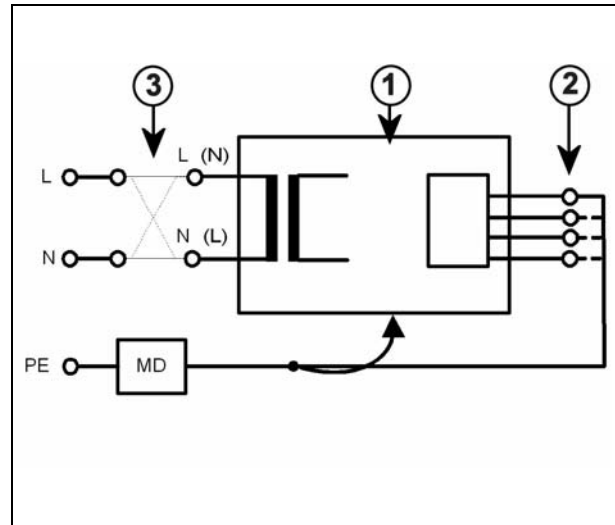


Fig. 3 Measuring circuit for direct measurement of the device leakage current according to DIN VDE 0751-1:2001-10, Fig. C5 for protective class II.

- 1 = System
- 2 = Application part (if present)
- 3 = Measuring set-up (integrated in the measuring instrument)

### Differential measurement

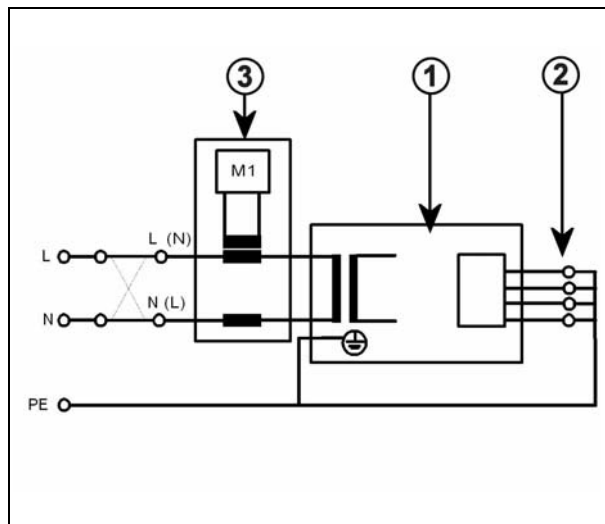


Fig. 4 Measuring circuit for measuring the device leakage current according to the differential current method according to DIN VDE 0751-1:2001-10, Fig. C6 for protective class I.

- 1 = System
- 2 = Application part (if present)
- 3 = Measuring set-up (integrated in the measuring instrument)

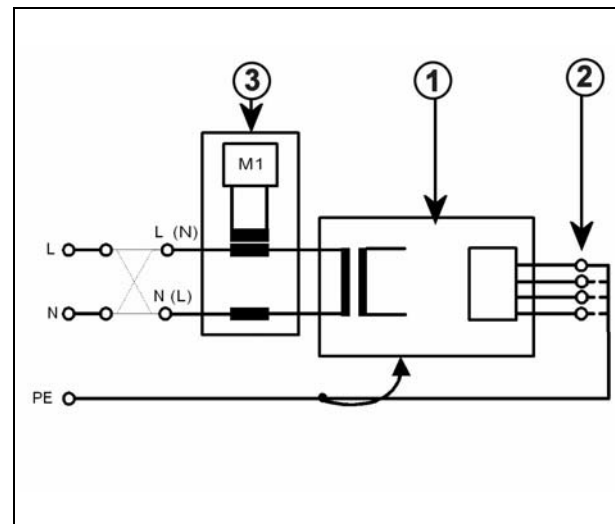


Fig. 5 Measuring circuit für measuring the device leakage current according to the differential current method according to DIN VDE 0751-1:2001-10, Fig. C6 for protective class II.

- 1 = System
- 2 = Application part (if present)
- 3 = Measuring set-up (integrated in the measuring instrument)



**Comments:**[illegible]

Tab. 4

[illegible]

Tab. 4

## Patient leakage current report

System: \_\_\_\_\_

Material number: \_\_\_\_\_

Serial number: \_\_\_\_\_

Cust.-spec. ident number \_\_\_\_\_

### Patient leakage current

	First measured value	Repeat measurements measured value				
Patient leakage current 1st application part						
Patient leakage current 2nd application part						
Patient leakage current 3rd application part						
Patient leakage current 4th application part						
Patient leakage current 5th application part						
(*1) Measuring circuit:						
Measuring instrument type:						
Measuring instrument Ser No.:						
Measuring instrument calibrated up to:						
Assessment:						
Date:						
Name:						
Signature:						

Tab. 5

(\*1) Measuring circuit: See Fig. 6 and Fig. 7, next page

## Measuring circuit

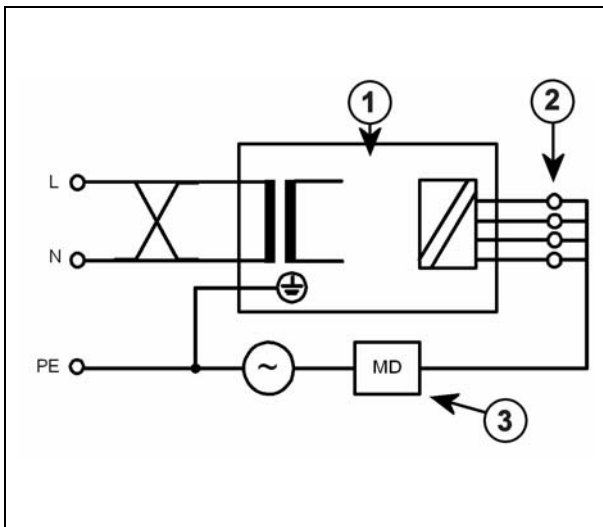


Fig. 6 Measuring circuit for measuring the patient leakage current (line voltage at the application part) according to DIN VDE 0751-1:2001-10, Fig. C8

1 = System  
2 = Application part type F (floating)  
3 = Measuring set-up (integrated in the measuring instrument)

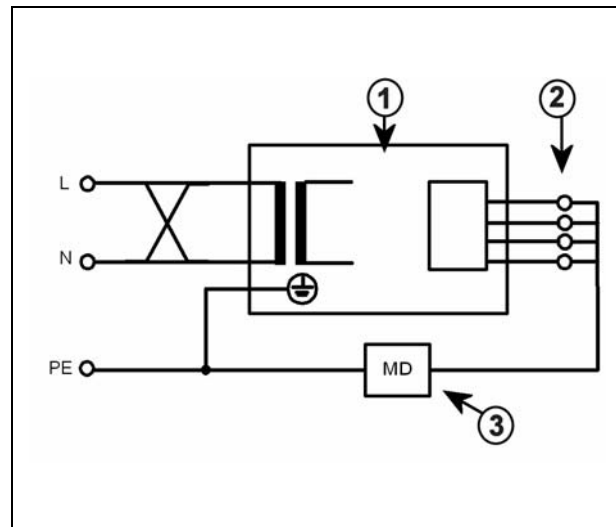


Fig. 7 Measuring circuit for measuring the patient leakage current for an application part type B with protective conductor according to DIN VDE 0751-1:2001-10, Fig. C10

1 = System  
2 = Application part type B  
3 = Measuring set-up (integrated in the measuring instrument)

**Comments:**

[illegible]

Tab. 6

- Chap. 0      Cover page, revision level and table of contents were revised.
- Chap. 1      Protective conductor measurement and leakage current measurement inserted.
- Chap. 2 - 6      Reference to installation report inserted.
- Chap. 3      Reports newly inserted.

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